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THE PROSOPIDIDÆ OF SOUTHERN MAINE.

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Waldoboro, Maine.

The various species of Prosopis indigenous to southern Maine have been collected from June 16 to August 25. Of the eight local species enumerated in this paper only P. *pygmæa* and *P. modesta* are common, while *P. variifrons*, *verticalis* and *basalis* are very rare. Specimens of these bees have been taken most frequently on the flowers of *Aralia hispida* and the garden blackberry (*Rubus villosus*), to both of which they are common visitors. They are also often found on the inflorescence of the golden-rods, and less frequently on many other blossoms. The local species may be separated by means of the following key:

FEMALES.

Entirely black, a large species, 9 mm..... **basalis.**
Black with yellow marks.....1.
1. Collar black or unspotted.....2.
Collar with two yellow spots.....4.
2. Face-marks subtriangular, yellow spots on tubercles, and often tegulæ, 4-5 mm..... **pygmaea.**
Face-marks narrow, tubercles and tegulæ dark, 4-5 mm..... **saniculae.**
Face-marks bow-shaped, larger size, 6 mm.....3.
3. A transverse mark on clypeus, tegulæ spotted, marks nearly white.. **variifrons.**
A transverse mark on clypeus, tegulæ dark, marks pale yellow..... **elliptica.**
Clypeus wholly black, tegulæ usually dark, marks yellow..... **verticalis.**
4. A yellow spot on base of costal nervure and on each tegula..... **ziziae.**
Base of costal nervure, or wing base, without a yellow spot, tegulæ usually dark..... **modesta.**

MALES.

Collar wholly black.....1.
Collar with two yellow stripes or spots.....5.

1. Scape dilated, larger size....2.
   Scape not dilated, smaller size....4.
2. Scape broader than long, cordate, concave beneath, the frontal half yellow, tubercles dark, 7 mm....**basalis.**
   Scape longer than broad....3.
3. Scape triangular in form with a yellowish white spot in front, the upward extensions of lateral face-marks obliquely truncated the inner angle prolonged to a point above the insertion of antennæ..**variifrons.** (*antennata*).
   Scape obconical, black, upward extensions of lateral face-marks diverging from the eye-orbit, and ending on a smooth, shining, rounded space above the insertion of antennæ....**verticalis.**
4. Face below sockets of antennæ lemon yellow, upward extensions of lateral face-marks diverging from eye-orbit and club-shaped or rounded at apex, 4-5 mm....**pygmaea.**
   Four separate marks upon face, a subquadrate spot on clypeus, a smaller one on supra-clypeal piece, and a stripe on each side, 4-5 mm....**saniculae.**
5. Scape arcuate, a yellow spot on base of costal nervure and on each tegula, upward extensions of lateral face-marks truncate....**ziziae.**
   Scape normal, unspotted, base of costal nervure or wing-base without a yellow spot, upward extensions of lateral face-marks obtusely pointed....**modesta.**

Prosopis pygmaea Cr.

1869. *Prosopis pygmæa* Cr. (not Schenck), ♂, Pr. Bost. Soc. Nat. Hist. 12:272.
1896. *Prosopis pygmæa* Robt. ♀ ♂, Can. Ent. 28:137.
1901. *Prosopis pygmæa* Lov. ♀ ♂, Ent. News, 12:5.
1907. *Prosopis cressoni* Ckll. Ann. Mag. Nat. Hist. ser. 7, 20:131.

Specimens of the female were collected on the garden blackberry, June 19–25; Solidago, August 19–September 8; Aralia hispida, July 15; of the male on the garden blackberry, June 19–21; Solidago, August 9–25. A common and widely distributed species, reported also from Connecticut, Indiana, Illinois, and Colorado. At Falls Church, Va., it has been taken May 30 on chinquapin, and July 6 on Ceanothus by Dr. Nathan Banks. As the European *P. pygmæa* Schenck, according to Dalla Torre, is a synonym of *P. brevicornis* (Nyl.) Schenck, the long established specific name given by Cresson has been retained.

Variations in the yellow marks are common; in the female there is usually a spot on each tegula but it may be absent, occasionally there is a spot on the clypeus, the lateral face-marks may be reduced to a stripe or a spot, while in one male the tubercles

are dark. In the male the 1st abdominal segment may be nearly impunctate, or sparsely and finely punctured. In this species as well as in *P. ziziæ*, *P. modesta* and other forms mounted specimens sometimes have the marks red. At first I supposed that this was a natural variation in color, but I have recently ascertained experimentally that this change is caused by leaving the specimens for too long a time in the cyanide jar. When a number of wasps belonging to the genus Vespa were left in the cyanide jar for some weeks, on examination the yellow marks were found to have all changed to bright red. Specimens of *P. modesta* with yellow marks were then exposed to the action of cyanide of potassium, and in a few days they became red. Even dried specimens were similarly effected. It is important that this artificial change of coloration should be generally known since it might easily lead to erroneous conclusions.

Prosopis saniculae Robt.

1896. *Prosopis saniculæ* Robt. ♀ ♂, Can. Ent. 28:137.
1901. *Prosopis saniculæ* Lov. ♀, Ent. News, 12:5.

Three females taken on *Aralia hispida*, July 15–16. I have a male from Point Abbaye, Mich., collected by Morgan Hebard, July 24, 1903, for which I am indebted to Mr. H. L. Viereck.

Prosopis affinis Sm.

1853. *Prosopis affinis* Sm. ♀ (not ♂), Cat. Hym. Brit. Mus. 1:24.

Many attempts have been made to identify *P. affinis* Sm., none of which appear to have been correct. Fortunately the types are still preserved in the British Museum, and through the kindness of Col. C. T. Bingham I have obtained new descriptions of both sexes accompanied by very excellent figures. The description of the female is as follows:

"♀.—Black. Head: the sides of the face with a triangular yellow patch extending from the level of the base of the mandibles to a little above the level of the insertion of the antennæ; antennæ castaneous brown. Thorax: a medially interrupted line on the pronotum, the tubercles and a spot in front of the tegulæ yellow; wings hyaline and iridescent, tegulæ, stigma and nervures castaneous brown, the nervures of a paler tint than the tegulæ or stigma; legs castaneous brown, the coxæ black, the basal half of the tibiæ of the anterior and posterior legs and the basal third of the tibiæ of the intermediate legs yellow. Abdomen: the apical margins of the segments 1-5, obscurely castaneous. Head about as broad as the thorax, trans-

verse, more than twice as broad as long, very closely, finely and evenly granulate; mandibles coarsely rugose in the middle on the outer side; clypeus trapezoidal, much longer than broad and about half the width at its posterior margin from what it is at apex; space between the base of the mandibles and the eyes very short; the eyes narrow and elongate, the cheeks behind the eyes not much developed; front between the base of the antennæ triangularly raised, the surface flat; antennæ short and robust, the basal two or three joints of the flagellum moniliform; the ocelli in a shallow arch on the vertex. Thorax, closely, finely and evenly granulate, broadly oval; pronotum transverse very narrow; mesonotum with longitudinal parallel short impressed lines; scutellum crescentic; median segment short roundly and obliquely truncate, the triangular area at base coarsely longitudinally rugose; pro-, meso- and metapleuræ rather flat. Abdomen: comparatively massive, smooth, the basal segment with very sparse minute punctures, posterior segments with scattered erect hairs. Length of ♀ 6 mm.; expanse 11 mm. The labels on the specimens bear no precise locality— simply "U. S. America.' "

The more important characters in which the female of *P. affinis* Sm. differs from the female of *P. ziziæ* Robt., which was formerly identified as Smith's species, are the much broader head and the absence of a yellow spot on the base of the costal nervure. They also appear to differ in distribution. Smith described three species of Prosopis from North America: *P. basalis* was from Hudson's Bay and was collected by G. Barnston; *P. confluens* was from St. John's Bluff, East Florida, and was collected by E. Doubleday; while the label of *P. affinis* gives only "U. S. America" as the locality, the British Museum Catalogue gives the locality as "Hab. North America, (E. Doubleday, Esq.)," from which it may be inferred with much probability that it was collected in East Florida in the same locality as *P. confluens.* If this supposition is correct, then we may have been looking for *P. affinis* in a part of the country in which it does not occur. The characters and distribution of *P. ziziæ*, therefore, appear to differentiate it from *P. affinis*, though undoubtedly the species are closely allied.

Prosopis binghami sp. nov.

1853. *Prosopis affinis* Sm. ♂ (not ♀), Cat. Hym. Brit. Mus. 1:24.

The male assigned to *P. affinis* evidently does not belong to it, but is a distinct species. After a careful comparison of the male and female types Colonel Bingham writes under date of November 5, 1907, "I am disposed to agree with you that ♂ and ♀ *P. affinis* Smith belong to distinct forms." I take great pleasure in dedicat-

ing this species to Colonel Bingham in acknowledgment of his kindness in redescribing and figuring Smith's types.

"♂. Differs from the female (*P. affinis* which Smith regarded as the female of this bee.—J. H. L.) conspicuously in color of the abdomen, which is exactly the color of a peeled horse-chestnut, in the more slender shape of the body and in the head and thorax being clothed somewhat thickly with short, erect, whitish hairs. The more minute differences in color and sculpture are as follows: Clypeus and the raised triangular area above it, the tibiæ of the fore- and the tarsi of all the legs, yellow; the pronotum without the yellow transverse line above. Head slightly wider than the thorax not so long as in the female; antennæ proportionately longer, the basal joints of the flagellum not markedly moniliform. Thorax: the mesonotum without the impressed lines, the triangular space at base of the median segment very closely and coarsely punctured, not longitudinally rugose as in the female. Abdomen: basal segment with more minute and scattered punctures and on its basal half somewhat thickly covered with erect hairs. Length 6 mm.; expanse 10 mm."

For the two excellent figures of Smith's types illustrating this paper I am indebted to Colonel Bingham. Fig. 1. represents the female of *P. affinis*, and Fig. 2 the form wrongly supposed by Smith to be the male of this species, to which I have given the name *P. binghami*.

Prosopis ziziae Robt.

1896. *Prosopis affinis* Robt. (not Smith), ♀ ♂, Can. Ent. 28:136.
1896. *Prosopis ziziæ* Robt. Can. Ent. 28:136. (Proposed as an alternative name.)
1898. *Prosopis ziziæ* Ckll. ♂, Ent. 31:187.
1901. *Prosopis affinis* Lov. ♀ ♂, Ent. News, 12:6.
1904. *Prosopis ziziæ* Robt. ♀ ♂, Can. Ent. 36:274.

This species occurs throughout the northeastern states, and I have before me specimens of both sexes taken at Falls Church, Va., by Dr. Nathan Banks. I am not aware that it has ever been reported from Colorado, New Mexico, or the extreme southern states. It is not a common species in this locality. The female has been collected on the garden blackberry, June 24–25; Solidago, August 9–20; male on the garden blackberry, June 24; and Solidago, August 9–21. This species has been repeatedly identified as *P. affinis* Sm., but as has already been shown the two forms not improbably occupy different areas.

Prosopis modesta Say

1837. *Hylæus modestus* Say, ♀ (not ♂), Bost. Jour, Nat. His. 1:392.
1859. *Hylæus modestus* Lec. ed. Say's Writ. 2:771.
1869. *Prosopis affinis* Cr. ♀ ♂, Pr. Bost. Soc. Nat. Hist. 12:270.
1882. *Prosopis affinis* Prov. ♀ ♂, Faun. ent. Can. Hym. p. 727.
1901. *Prosopis modesta* Lov. ♀ ♂, Ent. News, 12:5.

Say's description of *P. modesta* is so brief and indefinite that the correct determination of the species has long been regarded as problematical. Unfortunately the types are no longer in existence. But the name has been so widely used that to reject the species as indeterminable is open to serious objection, since it will long linger on in lists and synonomies and continue to prove a source of error. The elimination of *P. affinis* Sm., greatly simplifies the problem, as it was with this species that *P. modesta* was most frequently confused.

In 1825, Say left Philadelphia, his native city, and joined William Maclure's community at New Harmony, in Indiana, where he remained until his death in 1834. His description of "*Hylæus modestus*" was published in 1837, so that it is probable that his specimens were collected in Indiana; and that, as he described only one species, they were common forms. Some years ago Mr. R. J. Weith collected for me at Elkhart, Indiana, a large number of bees, among which were three species of Prosopis: two of these were *P. pygmæa*, and *P. ziziæ*, and the third the most common form, I believe was the *P. modesta* of Say. Of the four or five other species of Prosopis occurring in this state there is little probability that any one of them can be Say's species, so that there would seem to be no objection to the acceptance of this identification of *P. modesta*.

Say's description of the female of *P. modesta* is as follows:—"♂. Black, opake; abdomen polished; hypostoma on each side with a triangular spot; collar with an abbreviated, transverse, yellowish line on each side; pleura with a yellowish spot under the humerus; wings hyaline, with blackish nervures; feet with whitish knees. Length over one fifth of an inch."

It will be noticed that there is no mention of a spot on the edge of the wing base, or on the tegulæ, so that the description cannot apply to *P. ziziæ*. To suppose that Say omitted to mention these marks would be a gratuitous assumption, the burden of proving which would rest upon the person suggesting it. I give below

the more important characters of the two sexes drawn from material collected at Elkhart, Indiana.

♀.—Length 6½ mm. Black, with lemon yellow marks on the face, collar, tubercles and legs. Head a little longer than broad, the clypeus minutely roughened with sparse very faint punctures; face above the insertion of the antennæ closely and finely punctured; the yellow mark on each side of the face triangular with a small notch opposite the socket of the antennæ, the upward extension pointed, but in a large Maine series variable in form. Two spots on the collar; mesothorax closely and strongly punctured; the tubercles yellow. Wings hyaline tinged with fuscous, nervures, stigma and tegulæ chestnut brown, or the tegulæ darker. Legs black, the anterior and intermediate tibiæ in front at base, and the entire basal half of posterior tibiæ yellow, tarsi chestnut brown. Enclosure on disc of metathorax distinct, the base coarsely ridged. Abdomen smooth and shining, the first segment very finely and sparsely punctured, the apical margins of the segments brownish.

♂.—Length 5½ to 6 mm. Clypeus, supra-clypeus, and sides of face lemon yellow, the upward lateral extensions obtusely pointed. Two spots on the collar, the tubercles, the anterior tibiæ in front, the intermediate and posterior tibiæ at base, and all the tarsi pale yellow. The antennæ black, the flagella light brown beneath. The face finely, the mesothorax strongly punctured; the enclosure of the metathorax coarsely and irregularly pitted. Wings nearly hyaline or tinged with fuscous, nervures, stigma and tegulæ chestnut brown, or the tegulæ piceous. First abdominal segment smooth and shining, finely and sparsely punctured.

The male described by Say does not belong to this species, and can not be determined with much certainty. *P. illinoiensis* Robt. is closely allied to *P. modesta*, but the male is described as having the first abdominal segment impunctate. *P. pennsylvanica* Ckll. has the marks chrome yellow. *P. modesta* is a very common species in the eastern states, and in a large series of specimens exhibits considerable variation. The interrupted yellow line on the collar is wanting in a few specimens, and rarely there is a yellow dot on the tegulæ. The males sometimes have a spot on the labrum and yellow lines on the mandibles; the punctation of the 1st abdominal segment also exhibits considerable variation. Specimens of the female have been taken on *Rubus strigosus*, June 16; *Aralia hispida*, July 16; Solidago, August 19; *Eupatorium perfoliatum*, August 25; of the male on *Rubus strigosus*, June 25; *Spiræa salicifolia*, July 16; *Aralia hispida*, July 28; and Solidago, August 19.

Prosopis variifrons Cr.

1869. *Prosopis variifrons* Cr. ♀, Pr. Bost. Soc. Nat. Hist. 12:270.
1869. *Prosopis antennata* Cr. ♂, Pr. Bost. Soc. Nat. Hist. 12:271.

It is probable that *P. antennata* is the male of *P. variifrons*. Both forms have been found in New Mexico and Colorado, but there is no record of the capture of the opposite sex of either species. The possibility that they represented the sexes of a singles species was pointed out by Professor Cockerell in the Entomologist, in 1898, and after examining specimens from both of the localities mentioned I am inclined to believe that this is the case. They agree in the following characters: deep black color with nearly white marks, immaculate color, tubercles and tegulæ spotted, longitudinal crenulate rugæ covering the entire enclosed area upon the metathorax, head and thorax opaque, finely and closely punctured, and color of the wings. The female often has a transverse trilobed mark upon the clypeus, but in some instances only the two lateral lobes are present and in others only the central lobe. At Waldoboro I have taken only one male on *Cratægus coccinea*, June 14, 1905.

Prosopis elliptica Kirby.

1837. *Prosopis elliptica* Kirby, ♀, Faun. Bor—Am. 4:266.

This species is very closely allied to *P. variifrons*. Through the kindness of Mr. H. L. Viereck I have three specimens, which I refer to *P. elliptica* ♀, collected by Morgan Hebard at Pequaming, Mich., July 1, 3, and 12, 1903. They differ from *P. variifrons* in having the marks lemon yellow instead of nearly white, while the tegulæ are unspotted. As in *P. variifrons* the collar is wholly dark, the tubercles spotted, the face-marks bow shaped, and there is a transverse mark on the clypeus sometimes reduced to a central spot. The differences are evidently varietal rather then specific and it is not improbable that *P. elliptica* replaces *P. variifrons* northward, as the type locality is British America. Until the male is definitely known its position can hardly be determined with certainty. I have taken one female at Waldoboro, July 2, which I refer doubtfully to this species.

Prosopis verticalis Cr.

1869. *Prosopis verticalis* Cr. ♂, Pr. Bost. Soc. Nat. Hist. 12:271.
1909. *Prosopis verticalis* Lov. ♀, Ent. News, 20:413.

I have taken one male at Waldoboro on an umbelliferous plant, July 14, which agrees with the description in all respects except that there is a small spot on each tegula. From Falls Church, Va., from Dr. Nathan Banks, I have one male and two females. In all three specimens the tegulæ are unspotted. The face-marks of the ♀ are bow-shaped and the collar is dark as in *P. variifrons*, but the mark on the clypeus is absent. The anterior and intermediate legs are wholly black, but the posterior tibiæ, are ringed with yellow. The rugæ of the enclosure upon the metathorax are longitudinal.

Prosopis basalis Sm.

1853. *Prosopis basalis* Sm. ♀ ♂, Cat. Hym. Brit. Mus. 1:23.
1869. *Prosopis basalis* Cr. ♀ ♂, Pr. Bost. Soc. Nat. Hist. 12:269.
1901. *Prosopis basalis* Lov. ♀, Ent. News, 12:4.

Female taken on the wild rose, July 10, 1905; and on *Aralia hispida*. The type locality is Hudson's Bay. A widely distributed species also reported from Colorado and New Mexico. I have a female from Point Abbaye, Mich., July 10, and a male from Pequaming, Mich., July 1, both collected by Morgan Hebard. The form of the dilated scape in the male is very remarkable, but no explanation of its ecological significance seems ever to have been suggested.